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FROM MINE TO MARKET

...metallurgy has paced the progress of man



From earliest days man has used metals to ease his toils. As his knowledge of metals and their uses increased, man learned how to build a better world. Metal science today continues to research, develop and economically produce stronger and purer metals and alloys to manufacture metal products from rockets to razor blades.

"THE GERMAN ALCHEMIST" BY HANS HOLBEIN THE YOUNGER, 1497 - 1543



Published by
authority of
the Hon. Mitchell Sharp
Minister of Trade and Commerce
Ottawa, Canada

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Canada at the National Metal Exposition and Congress

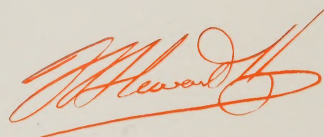
Stand 520 • Cobo Hall • Detroit, Michigan • October 18 to 22, 1965



We take pleasure in welcoming you to the Canadian Exhibit at the National Metal Exposition and Congress in Cobo Hall, Detroit, October 18 to 22, 1965. This booklet lists the Canadian exhibitors and describes the outstanding machinery and metal products they have to offer.

Representatives of the exhibiting companies and the Canadian Department of Trade and Commerce will be pleased to answer inquiries, and a representative of Canada's Department of Defence Production will be present to discuss questions relating to the Canada-United States Defence Production Sharing Program.

Information on the full range of quality products and services available from Canada can be obtained at any time from this office or any of the other Canadian Trade offices.



H. S. Hay
Consul and Trade Commissioner
Canadian Consulate
1139 Penobscot Building
Detroit, Michigan, 48226
Tel: 965-2811 (Area Code 313)

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From Canada — Metals and Machinery for the World

Canada's fast-growing metal industry makes use of a combination of skills, arts, crafts and sciences—in mining, smelting, refining, researching, fabricating—and markets an extensive range of products throughout the world.

Since 1950 the growth rate of Canada's mining and mineral industry has almost doubled that of the world mineral industry as a whole. Production in 1964 was valued at more than \$3.4 billion—a sevenfold increase since 1940.

Canada is also increasingly recognized as a source of sophisticated machinery and equipment for a wide variety of industries, including custom-designed products for application in mining, smelting and fabricating. Many of these specialized metal products developed by Canadian designers have found enthusiastic acceptance on world markets—exports of heavy machinery and equipment have increased 90 per cent since 1961.

Metals and minerals account for about one third of Canada's export trade, and approximately 60 per cent of the total mineral production is exported to markets in 86 countries. Canada has long been the world's largest producer of nickel, zinc, asbestos and platinum metals—and second or

third largest producer of several other metals. New alloys developed and perfected in Canada are in increasing supply, and the variety of metal products offered by the Canadian industry broadens continually.

Exports of minerals and mineral products in the crude and semi-processed state to the United States in 1964 amounted to more than \$2 billion. Of this total, iron ore accounted for almost \$294 million. About 80 per cent of Canada's mineral exports go to the United States, but Britain, Japan and Western Europe are also important markets, particularly for iron ore.

The mining industry spends almost \$45 million annually in the search for new ore bodies. Heavy investment in equipment and exploration, and a dynamic new technology, have made Canada virtually self-sufficient in major mineral reserves. Some 60 metals and minerals are produced in Canada.

Products in the Canadian Exhibit at the National Metal Exposition and Congress in Detroit show the traditionally high quality of workmanship and advanced techniques of an outstanding machinery industry. The metal producers and fabricators at the Exposition are representatives of a

Canadian industry serving every facet of North American manufacturing.

Specialists in metallurgy and metal products are at the Canadian Exhibit to answer questions and discuss production problems. Further information on metals and metal products from Canada may be obtained from the Canadian Government Trade Representatives listed elsewhere in this booklet.

The new Roberts open pit of Steep Rock Iron Mines Limited at Steep Rock Lake, Ontario



Atlas Titanium Limited

Welland, Ontario, Canada

Tel: 735-5661 (Area Code 416)

titanium plating equipment, molten metal handling tools

Atlas Titanium Limited, incorporated in 1956, forms part of Canada's largest specialty metal facilities, serving customers throughout North America and in 20 overseas countries. A strong research and product development program has resulted in a variety of new products and processes for the metal industry.

The company was instrumental in perfecting a revolutionary process for plating with electrolytic nickel from titanium metal anode baskets. This method, considered one of the most significant recent advances in nickel plating technology, has been patented in Canada. Patents have been applied for in England and three European countries.

This principle of nickel plating has now been extended by a further product development. Titanium metal plating tanks, developed by Atlas research engineers, are now being tested with this plating process. Patents

have been applied for on this product in Canada, the United States and eight other countries.

After more than three years of laboratory and field testing, a series of hand tools to be marketed under the trade name Remal has been developed by Atlas Titanium for molten metal handling. Remal tools are made from titanium metal specially treated to give maximum resistance to the corrosion and washing effect of molten metals. They are coated with Atlon A, a proprietary compound which gives high or complete resistance to the attack of non-ferrous metals.

Remal tools are extremely light—weighing half as much as comparable steel units—and exceptionally strong. Mild steel has a yield strength of 15,000 to 20,000 pounds per square inch at 1,000° F. and Remal tools at similar temperatures possess yield strengths of almost 65,000 psi. These tools have exceedingly low heat conductivity, can be used for long periods without danger of corrosion, and have little or no detrimental alloying effect with the metals being melted.

Remal stirring rakes and ladles coated with Atlon A are on display, as well as a demonstration plating tank and plating baskets in various sizes and designs. Tools, tank and baskets are of titanium metal construction.

Atlas Titanium plating baskets are available in many sizes and shapes. All Atlas baskets carry identification numbers so their history can be traced back to the sponge to insure their guarantee.



Atomic Energy of Canada Limited

Commercial Products Division

P.O. Box 93

Ottawa, Ontario, Canada

Tel: 728-1841 (Area Code 613)

radioactive isotopes for industrial radiography

Atomic Energy of Canada Limited produces sources of radioactive isotopes, in safety-sealed welded capsules, for industrial and medical applications.

A variety of capsules, including examples of single and double-weld seals, and inactive forms of isotopes, are displayed by AECL.

Radioisotopes provide a simple, economical approach to non-destructive testing, cobalt 60 and iridium 192 radiography sources giving excellent definition of iron and steel in the thickness range from 1/4 inch to 12 inches.

Both isotopes are available with specific activities up to 200 curies per gram, and cobalt 60 sources for radiography range from one curie up to 3,000 curies or more depending on the application. Source diameters vary with output

from one to four millimeters for activities up to 60 curies.

Since a source emits radiation in all directions, it is ideal for panoramic shots, radiographing circumferential welds or for the radiography of many items simultaneously.

Development of production processes for other and less well-known isotopes will extend the usefulness in terms of definition and a wider range of thicknesses, and AECL is actively pursuing a development program for several isotopes of interest. A complete industrial consulting service for the application of radioisotopes is also available.

In addition to radiography, radioactive isotopes have many applications as tracers for investigating flow patterns and wear. Of particular interest to the metals industries are the investigation of the path and consumption of copper sulphate added as activator in a zinc flotation circuit, the measurement of the viscosity of molten metals, and the rate of wear of refractory furnace linings.

Remote welding techniques permit the sealing of the active material in stainless steel capsules of various designs, and the physical size of the radioactive source can be small enough for easy use in complicated structures and small access holes.

Remote manipulators for the safe handling of various radioactive materials at Atomic Energy of Canada Limited, Ottawa. AECL offers a complete industrial consulting service for the application of radioisotopes.



Automotive Parts Manufacturers' Association (Canada)

Suite 402

55 York Street

Toronto 1, Ontario, Canada

Tel: 366-9673 (Area Code 416)

information service for automotive parts industry

The Automotive Parts Manufacturers' Association (Canada) is an independent, non-profit organization representing the manufacturers of automotive parts, materials and supplies. The parts industry in Canada employs more than 40,000 people producing original and replacement equipment.

Organized 30 years ago, the association is regarded as the official spokesman for the automotive parts manufacturing industry, expressing the views of the industry as a whole to the various departments and agencies of government. It also provides an individual consulting service for its members. Information and advice are offered on questions of

tariffs, external trade, taxation, defence sharing and other problems involving the industry.

The association provides factual and objective information for U.S. companies seeking to establish in Canada. This service includes information on taxation, labor rates, plant location and market concentration, unions in Canada, and other information about doing business in the country. The association also publishes a comprehensive directory — available on request — of all automotive parts manufacturers in Canada.

Officials of the association will be pleased to discuss parts problems with prospective manufacturers and purchasers interested in the Canadian market.

Members of a Canadian Government Automotive Parts Association trade mission to Europe visiting a large auto parts manufacturing plant in England. The Canadian association provides market information for U.S. companies seeking to establish operations in Canada.



Baldrive

Division of Barrett Hydrostatics
Limited

East River Road

Galt, Ontario, Canada

Tel: 621-9831 (Area Code 519)

variable hydraulic transmission system

Baldrive — a Canadian invention — is a radial piston hydraulic system using balls for pistons. It achieves low weight-to-horsepower output, low friction, long life with high torques and ultra high speeds.

Baldrive, a division of Barrett Hydrostatics Limited, manufactures transmissions in which the pump and motor operate on a system of reciprocating and rotating balls, providing 99 per cent volumetric and 90 per cent mechanical efficiency in a smaller and lighter package than any other system.

As a system for the transmission of rotary power by hydraulic means, Baldrive requires no valves, auxiliary controls, high-cost piping, hoses, fittings or complex feedback. The system consists of four variations of a mechanically simplified radial piston pump motor. All hydraulic

forces are internally opposed and balanced. The housings are not subject to hydraulic pressure and only low-pressure seals are required on a shaft.

Baldrive motors, mounted in any position and at any distance from their power source, function on pressures as low as 10 pounds per square inch. Much higher pressures can be attained where operational compatibility with other equipment in a system is desirable.

Baldrive motors will operate safely and efficiently when immersed in water or other liquids, at high pressures and in explosive or toxic atmospheres. Operation of the Baldrive system is simple, economical and — because of its variable speeds — flexible.

A complete Baldrive system often weighs less than one pound per unit of horsepower. Because the units are so compact and light in weight, the size range is much greater than that of traditional units.

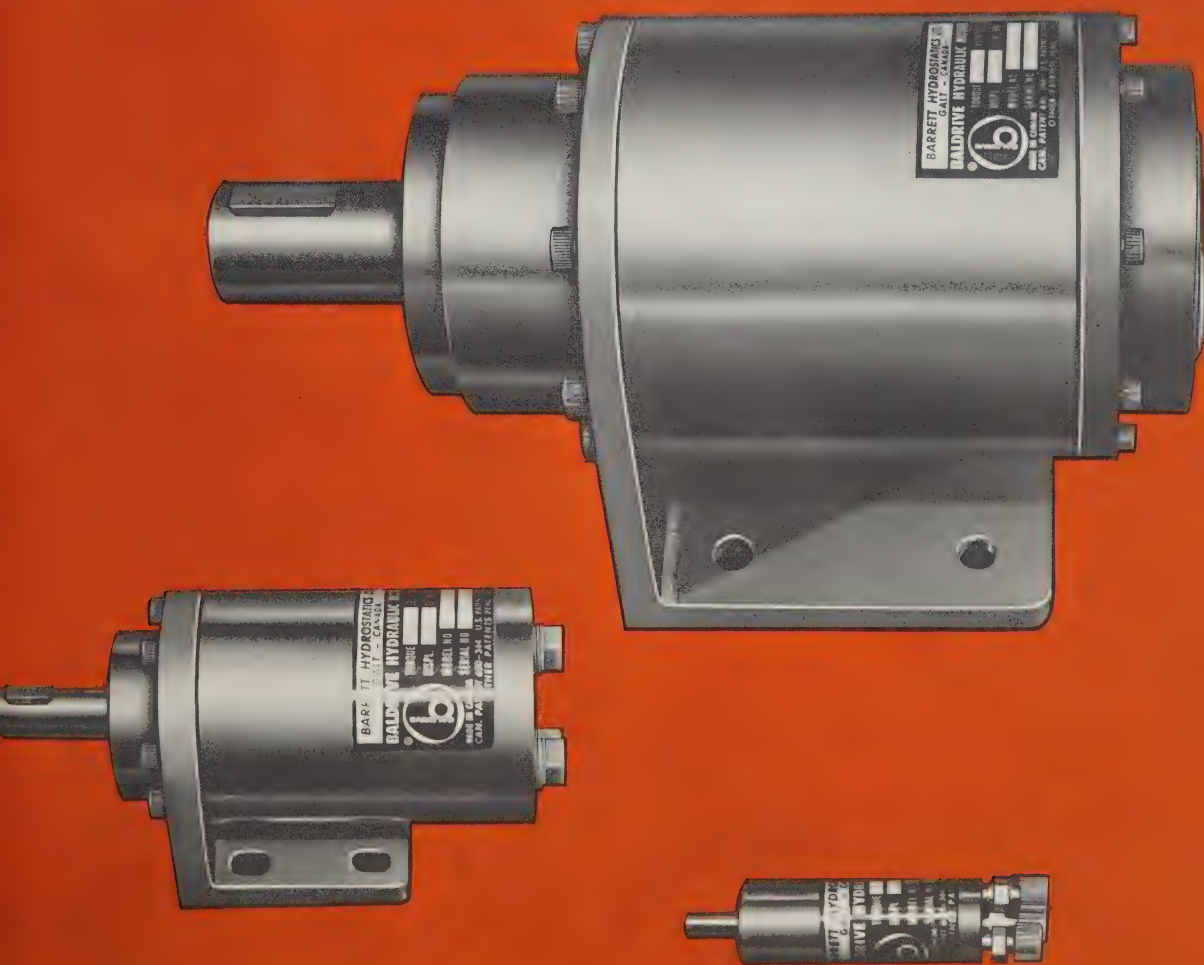
Small but powerful Baldrive motors can be used to drive individual spindles in multiple-spindle metalworking machines and can perform many functions in military and mobile applications. Baldrive motors are capable of impressive feats of strength in winders, winches, conveyers and mining machinery.

The company is showing a variety of Baldrive motors and pumps in sizes from 1½ hp to 800 hp.

Represented by:

John J. Scherer
Baldrive Sales Inc.
709 North Main Street
Royal Oak, Michigan, 48067
Tel: 543-8420 (Area Code 313)

Fixed-displacement Baldrive motors showing, top to bottom, the 600-series, 300-series and 100-series. Sizes range from 1½ hp to 800 hp at a recommended operating pressure of up to 2,000 psi.



Canada Iron Foundries, Limited

Foundry Division

171 Eastern Avenue

Toronto 2, Ontario, Canada

Tel: 363-8801 (Area Code 416)

precision castings

The Foundry Division of Canada Iron Foundries, Limited manufactures ingot molds, brake shoes, gray iron castings and alloy iron castings. All grades of gray and ductile irons are produced to ASTM specifications, in addition to a large number of low and high alloy irons. These include corrosion-resistant Ni-Resist iron, abrasion-resistant Ni-Hard and Domite CM and other specific types of iron.

The firm operates four iron foundries — one in Toronto, two in Hamilton, and one in St. Thomas. The St. Thomas plant is equipped with the latest type of automatic molding line for high volume production of gray iron castings required by the automotive and agricultural equipment manufacturers.

The largest present tonnage is in steel mill castings, produced in the Hamilton ingot mold plant.

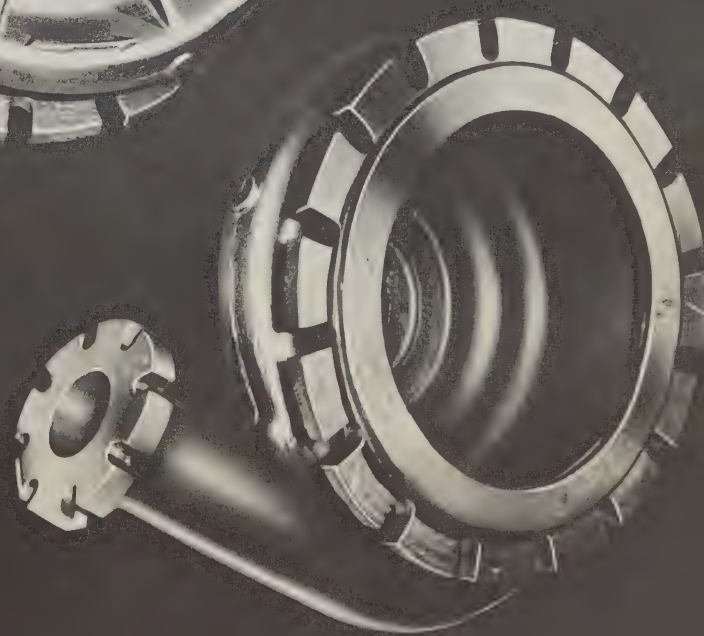
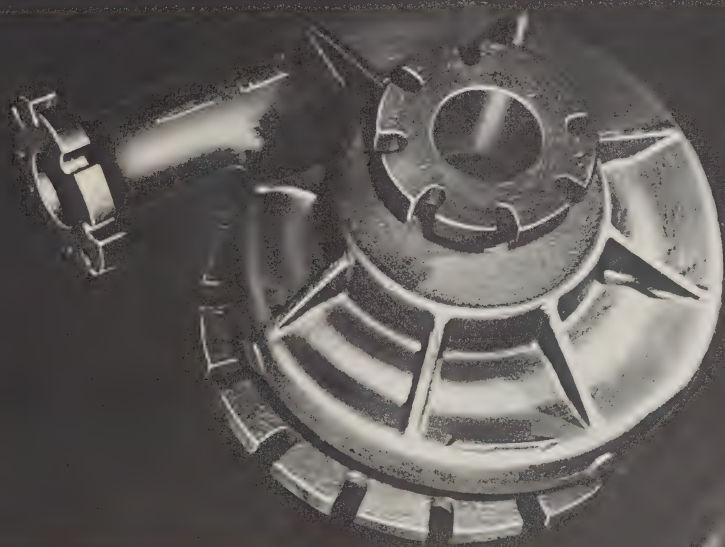
Stools and sprue plates for steel ingot production are manufactured in Toronto and Hamilton. Castings are made in appropriate grades of heat shock iron to withstand the tremendous thermal gradient imposed in service. Tunnel lining segments for public utility systems are made in the Toronto plant.

As well as stools and bottom plates for ingot molds, other alloy castings of high quality are produced at the alloy foundry in Hamilton. A wide range of materials — including all grades of ductile iron, Domite CM, Ni-Resist, Ni-Hard irons, and heat-resistant iron of 14 and 28 per cent chromium content — is in regular production in the foundry's electric furnace.

Alloys meet such diverse requirements as high strength, abrasion resistance, corrosion and creep resistance, and most combinations of these conditions. The range of applications is equally varied — a refiner plate for grinding pulp stock may be produced alongside the main trunnion for a radiation therapy unit.

Cast-iron core boxes and metal stamping dies are among the company's precision castings produced by the Shaw process — a refractory molding technique giving close dimensional tolerance and high surface finish.

Ni-Resist pump components for pulp and paper service and a class 35 ASTM gray iron transmission case are among the products manufactured by Canada Iron Foundries, Limited.



Canadian Special Machinery Company

1021 Rangeview Road
Port Credit, Ontario, Canada
Tel: 278-5594 (Area Code 416)

machinery for the metal industry

Canadian Special Machinery Company designs and manufactures high-speed production machinery for the metal and other industries.

With the trend to automation in industry, the company's designers are producing a range of equipment for the continuous forming and handling of ferrous and non-ferrous metals — wire-drawing machines and auxiliary equipment for the wire and cable industry.

On exhibit is the revolutionary heavy-duty Rehnqvist HB-5-100 Mark I wire-drawing machine with counterdrawing, designed for complete control in the manufacture of low and high carbon and stainless steel wire.

The Rehnqvist has a single motor, with power transmitted through differentials providing automatic speed adjustment between blocks. The back pull or counterdrawing ensures high

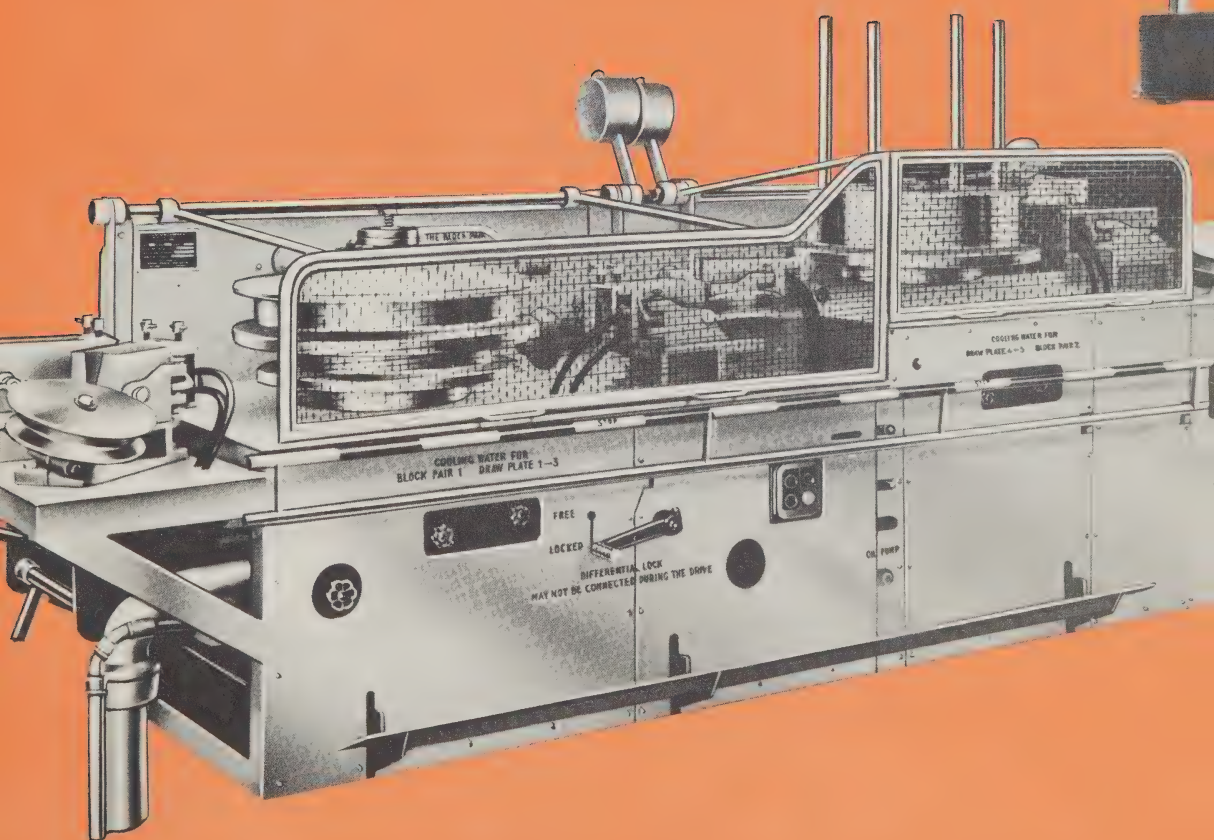
efficiency, reduced die friction and increased die life.

The machine processes wire of high standard, free from collusions or distortion. Accumulation blocks and wrapping arms — common causes of distortion — are not used. The wire is not twisted or worn flat through slippage. The Rehnqvist can be used to full advantage for two, three, four or five passes.

The main drive of the HB-5-100 provides a range of eight speeds — 142 to 1,340 feet per minute — to meet individual operational requirements.

With extensive experience, company designers specialize in the development of equipment to increase efficiency in the metal industry. The company is producing an automatic levelling, notching and shearing line for metal fabricators. The CSM-CL48 line accommodates four 10,000-pound steel coils 48 inches wide, and produces notched and cut pieces at high rates. Production quantities and lengths are pre-programmed for automatic feed and operation.

The Rehnqvist wire-drawing machine with counterdrawing for the high-speed production of steel and alloy wire.



Canadian Westinghouse Company Limited

Electronics Division

P.O. Box 510

Hamilton, Ontario, Canada

Tel: 528-8811 (Area Code 416)

electronic line tracer

Established 70 years ago, Canadian Westinghouse Company Limited is one of the largest electrical manufacturers in Canada, with more than 10,000 employees at 16 locations across the country and a total manufacturing area of more than 3,000,000 square feet. It also operates a research development laboratory with electrical, electronic, mechanical, chemical and metallurgical sections. The company exports to more than 40 countries.

A recent development of Canadian Westinghouse is a compact, lightweight electronic line tracer — Linatrol HL6 — an attachment for small flame cutting machines permitting direct control of the operation of a machine tool and full use of the drawing table.

Because of its modular construction, the tracer can be adapted to the over-all design of any machine. It can be secured to a

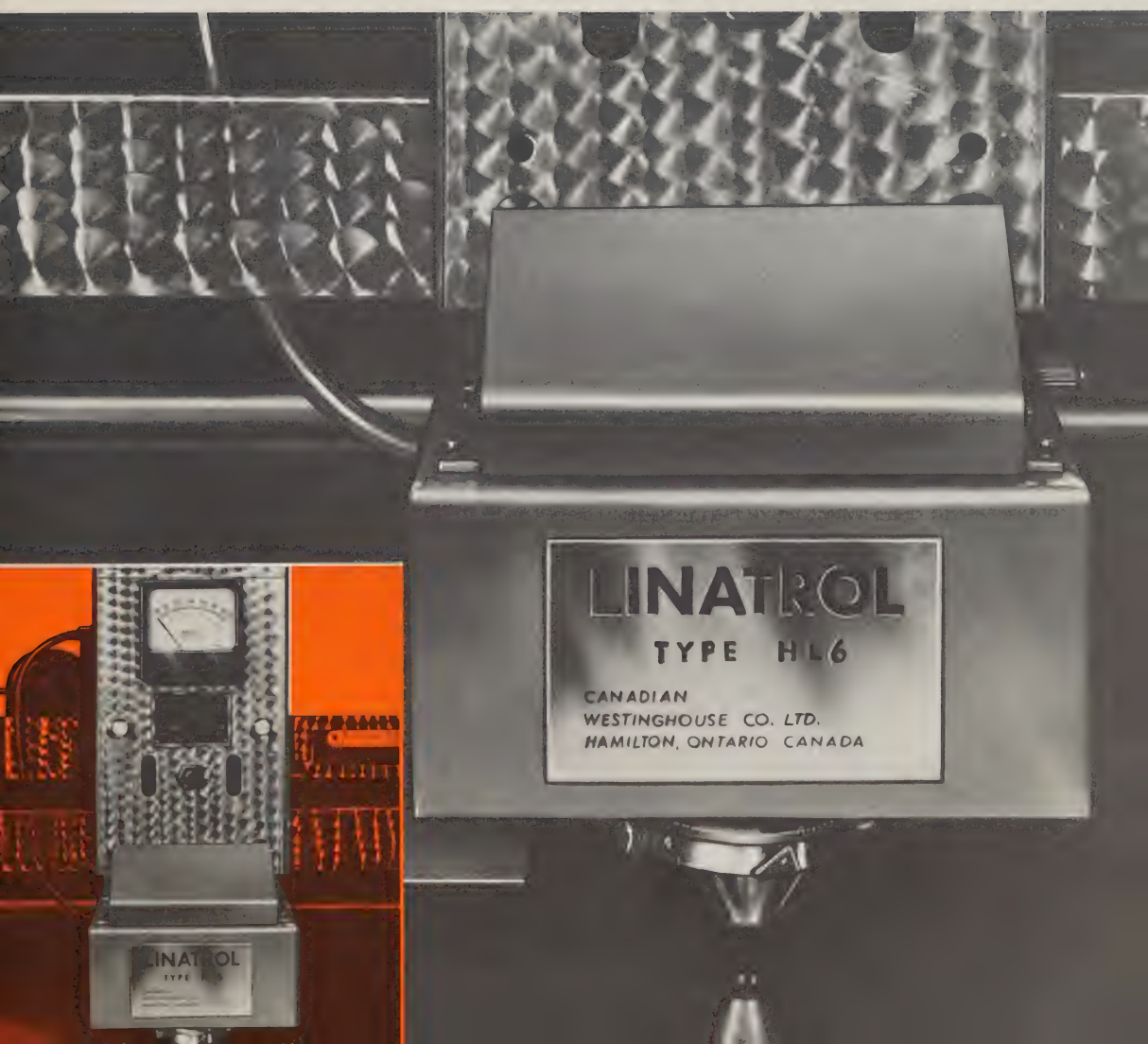
traction-type flame cutting machine simply and quickly without the use of tools. Improved reliability, easy maintenance and low cost are the key features of the HL6.

Weighing just under 12 pounds, the tracer measures 7.5 inches high, 7 inches wide and 11.5 inches deep. It has both manual and automatic steering and kerf offset to compensate for the width of the cut.

Nominal line width of the pattern to be traced is .03 inches and tolerance on line width is .01 inches. Minimum distance allowable between lines on drawing is $\frac{1}{8}$ inch.

Power consumption is 25 watts maximum. The tracer operates on 110 or 220 volts and is designed to operate on 50 or 60-cycle current.

A compact Linatrol HL6 electronic line tracer attached to a small flame cutting machine.



Cramco Solder Alloys

80 Sinnott Road

Scarborough, Ontario, Canada

Tel: 757-2876 (Area Code 416)

solders

Cramco Solder Alloys manufactures a comprehensive line of high-purity solders in ingot, bar and solid-wire forms. Solders are produced to customer specifications in all alloys and wire sizes.

The ER-99 resin-core solder, used in military and electronic soldering, is designed for high-speed production with the utmost safety in non-corrosive, non-conductive residue. It is widely used in radio and television production lines.

The OC-55 organic-core solder — favored for jewelry, sealed-beam lamps, fuses and Christmas lights — is an active but mild flux-core solder, less corrosive than acid-type fluxes. The flux decomposes at soldering temperature and the small amount of residue is easily removed with pure water.

The general purpose AC-66 acid-core solder is in the chloride group. Effective on all common metals except aluminum, magnesium and stainless steel, it

is used in the automotive, plumbing and tinsmithing industries.

The SC-77 cored-wire solder is the only stainless steel flux-core solder produced in Canada. Its residue is easily removed with warm water.

Cramco produces cast and extruded bars, ingots and rods for tinning and dip-solder operations. The company manufactures solder forms — predetermined amounts of solder in various sizes, shapes and alloys — prime body solders and handy block.

A few of the many solder products available from Cramco Solder Alloys, an aggressive young Canadian company producing both standard and custom solders to high technical specifications.



Department of Defence Production

Ottawa, Ontario, Canada
Tel: 992-3456 (Area Code 613)

Canada-United States defence production sharing

Canadian industry now actively participates in supplying defence material for U.S. defence programs, under the Canada-United States Defence Production Sharing Program which, in effect, adds Canadian suppliers to U.S. domestic source lists.

The immediate objective of the plan is to increase Canadian participation in the production and support of North American defence weapons and equipment. The long-range purpose is to co-ordinate the defence requirements, production and procurement of the two countries. As a result, it has been agreed that Canadian defence industry will be allowed equal opportunity to participate with U.S. industry in meeting U.S. defence requirements.

The Canadian Department of Defence Production is responsible for the administration of Canadian activities under the Defence

Production Sharing Program. United States interests are invited to investigate the many advantages of procurement from Canada. Inquiries may be addressed to: Director, International Programs Branch, Department of Defence Production, Ottawa, Canada.

Represented by:

John Morris
Defense Contract Administration
Services
1580 East Grand Boulevard
Detroit, Michigan, 48211
Tel: 923-0100 Ext. 300
(Area Code 313)

Many Canadian metal components are incorporated in the XM-571 Dynatrac amphibious vehicle. Present model includes complete cast rear differential, basic aluminum hull and cast aluminum articulation ball joint. This lightweight vehicle, which can be transported by medium helicopter, is produced in Canada under the Defence Production Sharing Program.



Dominion Magnesium Limited

7 King Street East

Toronto 1, Ontario, Canada

Tel: 362-7292 (Area Code 416)

magnesium ingots, billets, extrusions

Dominion Magnesium Limited produces high-purity magnesium metal from a white crystalline dolomite quarried in Ontario. The company has exported to 30 countries, including almost every industrialized country in the free world.

Magnesium and magnesium alloys, produced by the Pidgeon ferrosilicon process, are supplied in primary form as ingots and billets for forging and extrusion and in the secondary forms of extruded shapes, tubes, rods and bars.

Dominion Magnesium has an annual production capacity of 11,000 tons of high-purity magnesium and magnesium alloys. Calcium, strontium, barium metals and alloying grades of thorium and zirconium are also produced. Master alloys — calcium-magnesium, nickel-magnesium, copper-magnesium, nickel-calcium and copper-zirconium — are made

to customer specifications in sintered pellets.

Magnesium, the world's lightest structural metal, weighs 112 pounds per cubic foot — compared with aluminum at 175, steel at 449 and brass at 530 pounds per cubic foot. Magnesium provides a higher strength-to-weight ratio than any other commonly used metal and is often substituted for another metal to save weight without loss of strength. It can be cast, extruded, machined, welded, turned or swaged.

Magnesium is used in the manufacture of many products, including sporting, construction and defence equipment, tools, luggage, ladders. The most important use is in die castings such as those on chain saws, lawn mowers, and for automobile engines.

A recent development of Dominion Magnesium is a magnesium alloy diamond-drill rod. Field tests demonstrate that a magnesium rod weighing 500 pounds will drill to the same depth as a one-ton steel rod. The magnesium rod, now used in several countries, is manufactured by Aerometal Products and Design Limited — a fabricating division of Dominion Magnesium, producing a wide range of light metal structures in magnesium alloys.

Inspection of the tail assembly of a giant DC-8 jetliner is accomplished easily with a sturdy, lightweight ladder made from a magnesium alloy produced by Dominion Magnesium Limited.



Domtar Chemicals Limited

Metal Powders Division

1155 Dorchester Boulevard West

Montreal 2, Quebec, Canada

Tel: 874-5470 (Area Code 514)

metal powders

The Metal Powders Division of Domtar Chemicals Limited is a major supplier of sponge-iron and iron-alloy powders. Its products are used extensively in the United States and other export customers include Australia, Brazil, Chile, Britain and Japan.

In a new and fully automated plant at LaSalle, Quebec, the firm produces uniform quality products for use in metallurgy, coating of welding electrodes, flame cutting and scarfing, and other uses.

The LaSalle plant finishes powder obtained from raw material produced at the company's Lachine, Quebec, operation. It processes seven sponge-iron powders for powder metallurgy and three types of sponge-iron powders for the welding electrode industry. One is a fine welding electrode flux material, with variations in apparent density and screen analysis made to customers'

individual requirements at no extra cost. In the powder metallurgy category, Domtar's process lends itself to the production of pre-alloyed ferrous powders.

Other powders include one for cutting, scarfing and powder washing, a superfine powder for chemical and pharmaceutical applications and a mild steel powder for metal spraying processes.

The Metal Powders Division participates in research and development through the Dominion Tar and Chemical Company Limited Research Center at Senneville, Quebec, where metallurgists study current and future uses of powder in this fast-developing industry.

In the LaSalle plant of Domtar's Metal Powders Division, this equipment control panel and automatic scale help produce quality metal powders for a variety of industrial purposes.



The Electrolyser Corporation Ltd.

429 Islington Avenue South

Toronto 18, Ontario, Canada

Tel: 255-0138 (Area Code 416)

hydrogen generators

With the increased use of ultra high-purity hydrogen in metallurgy, industrial chemistry, electronics and electrical applications, many large companies are using Stuart electrolytic hydrogen cells and hydrogen plants to provide a simple, automatic and entirely reliable source of hydrogen.

The Electrolyser Corporation Ltd. is one of the largest manufacturers of electrolytic hydrogen cells and hydrogen plants. Units are available in capacities from 10 cubic feet per hour to hundreds of thousands of cubic feet per hour. The company has sold its plants in the United States, Latin America and Asia.

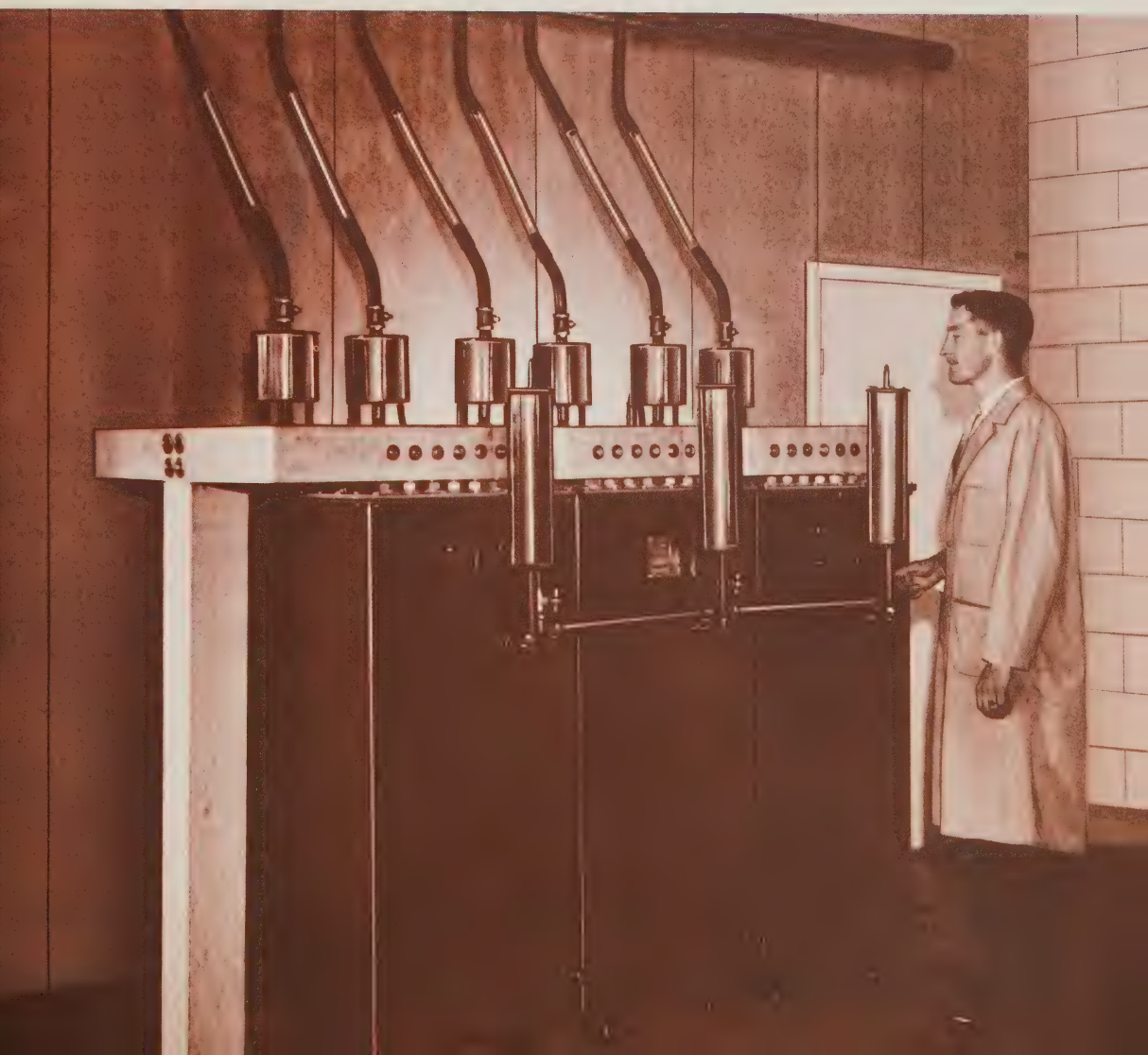
An electrolytic hydrogen plant consists of a rectifier for the supply of direct current power, cells for the decomposition of water by electricity into hydrogen and oxygen gases, and gas-compressing and storage facilities. With the advance of technology, the industrial applications of hydrogen

are growing constantly. For example, hydrogen is being used to change edible fats and oils into shortening, margarine and soap. Hydrogen is also used in the manufacture of lamp filaments, synthetic gems, fertilizers and nitrogen chemicals, heavy water, nylon, industrial solvents, machine tools and metallic hydrides.

Vast quantities of hydrogen are used by the iron and steel industry for annealing and other heat-treating furnaces requiring atmospheres of pure hydrogen or hydrogen mixed with other gases. Normally an electrolytic plant is used to supply the high-purity hydrogen atmosphere required to produce such products as stainless and silicon steels.

There are also many furnace atmosphere applications for hydrogen outside the iron and steel industry. Both hydro and steam electric generators normally rotate in an atmosphere of hydrogen to cut down windage losses and carry away heat.

These electrolytic cells extract hydrogen and oxygen from distilled water. Their compact design permits the production of large quantities of hydrogen in a minimum of space.



Fahralloy Canada Limited

Orillia, Ontario, Canada

Tel: 326-3555 (Area Code 705)

heat-resistant castings

Fahralloy Canada Limited specializes in high alloy castings resistant to heat corrosion and abrasion. The modern Fahralloy foundry produces quality castings by sand and shell molding and centrifugal casting methods.

Fahralloy was one of the first Canadian foundries to install a sand reclamation system to assist in maintaining the quality of molding sands. Mechanically rammed molds are hand finished.

Under the trade-mark Fahrspun the company produces centrifugally cast tubes in permanent molds, assuring clean metal and dimensional accuracy.

Fahralloy has extensive experience in the design and production of all types of cast heat-resistant equipment for use in industrial heat-treating furnaces and furnaces for the basic steel, petrochemical, cement and base metal industries.

A wide range of heat-resistant products is produced by Fahralloy,

including furnace trays, baskets and fixtures; rails, pier caps and structural parts for heat-treating furnaces; muffles and retorts; heat-resisting conveyer belts and chains; castings for cement plant kilns and coolers, furnace rolls, radiant tubes and tube sheets for the petrochemical industry.

Complete engineering and metallurgical consulting services are available to all customers. Fahralloy's engineering department initiates design work and orders and acts as liaison between customer and production staff.

Quality castings are assured by rigid metallurgical control. Spectrographic analysis is carried out, and stringent inspection procedures include X-ray, magnetic particle and dye-penetrant testing.

Fahralloy F15-35 trays and fixtures carrying automotive gears and pinions through pusher-type carburizing furnace and oil quench.



General Impact Extrusions (Manufacturing) Ltd.

191 Evans Avenue

Toronto 18, Ontario, Canada

Tel: 255-8194 (Area Code 416)

aluminum impact extrusions

General Impact Extrusions (Manufacturing) Ltd. forces cold metal into hot shapes. The eight extrusion presses in the company's 74,000-square-foot Toronto plant shape 48 million parts annually.

G.I.E. produces collapsible tubes, aluminum cans and vials (decorated or plain), aluminum aerosol cans, technical aluminum impact extrusions up to six inches in diameter and 32 inches in length, aluminum impact extrusions for defence purposes, precision cold forgings and precision tubing in aluminum and SAP metal.

In addition to extrusion presses, G.I.E. has equipment to perform secondary machining operations and complete printing and lithography.

While G.I.E. almost exclusively impact extrudes aluminum alloys for consumer products, an

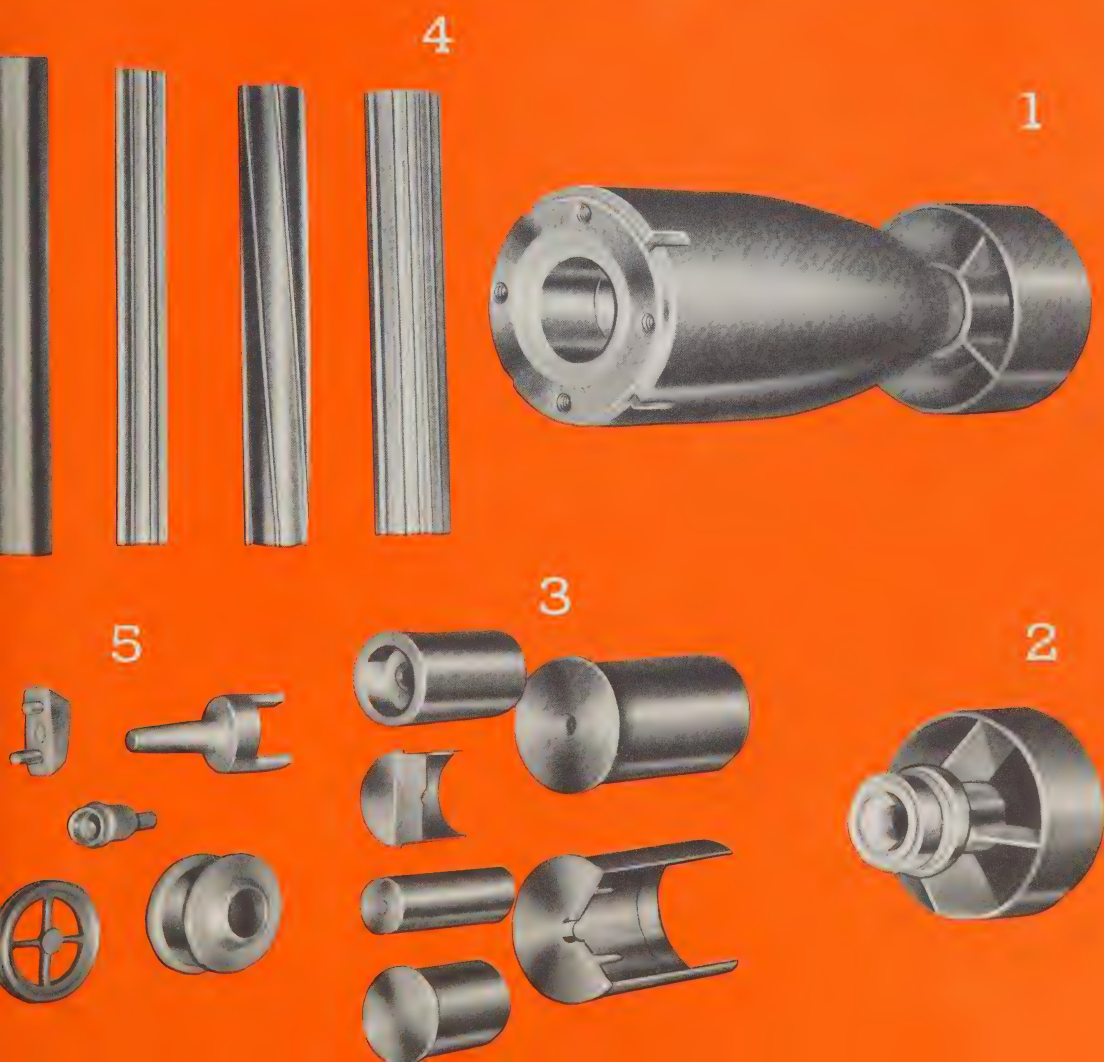
important future is foreseen in impact extruding steel. The company is conducting research and development in this area for a number of U.S. companies, as well as exploring the possibilities of forming parameters for zinc, copper, and a host of other materials.

G.I.E. has also done pioneer work in impact extruding sintered aluminum. A two-inch diameter, six-inch long billet is formed on a 750-ton HPM hydraulic impact press into a 14-foot long extrusion of $7/8$ -inch diameter — believed to be the longest part ever formed in Canada by the forward impact extrusion method.

Impact extrusions are advisable when ratio of length to diameter exceeds 2:1, when thickness of bottom must be greater than side walls, when side walls must be ribbed or fluted internally or externally from top to bottom, when tooling costs are high in other processes in relation to the quantities required, and when the walls of a part cannot have any draft.

G.I.E. is now extensively involved in U.S. defence projects for the production of ammunition components.

General Impact Extrusions (Manufacturing) Ltd. produces a variety of cold-formed metal products. By number they are: 1- U.S. Navy charge holder and fin assembly; 2- tall fin; 3- various sizes of cartridge cases; 4- forward extruded SAP tubing; 5- examples of small and intricate impact extrusions.



Geo-Met Reactors Limited

Albion Road

Ottawa, Ontario, Canada

Tel: 822-1266 (Area Code 613)

metallurgical research, crushed alloy additives

Founded in 1961, Geo-Met Reactors Limited operates a research and development facility for the mining and metallurgical industry. Research projects are now under way for companies in the United States, Australia, South Africa, India and Britain.

Geo-Met's major development programs have been centered around tin and molybdenum. Facilities for a new tin-extraction process developed by the company will be installed in a commercial plant in Cornwall, England, later this year. A process for extracting molybdenum from molybdenum copper ores is already operating on a commercial scale at the Geo-Met plant in Ottawa.

Geo-Met has successfully developed methods for producing special ferroalloys. Masterloy Products Limited, a subsidiary of Geo-Met, produces the specialized

ferroalloys for steel companies in the United States, Mexico, Britain, Western Europe, India and Japan.

Masterloy produces four important and specially prepared crushed alloy additives: ferrotungsten, ferrocolumbium, ferrovanadium and ferromolybdenum.

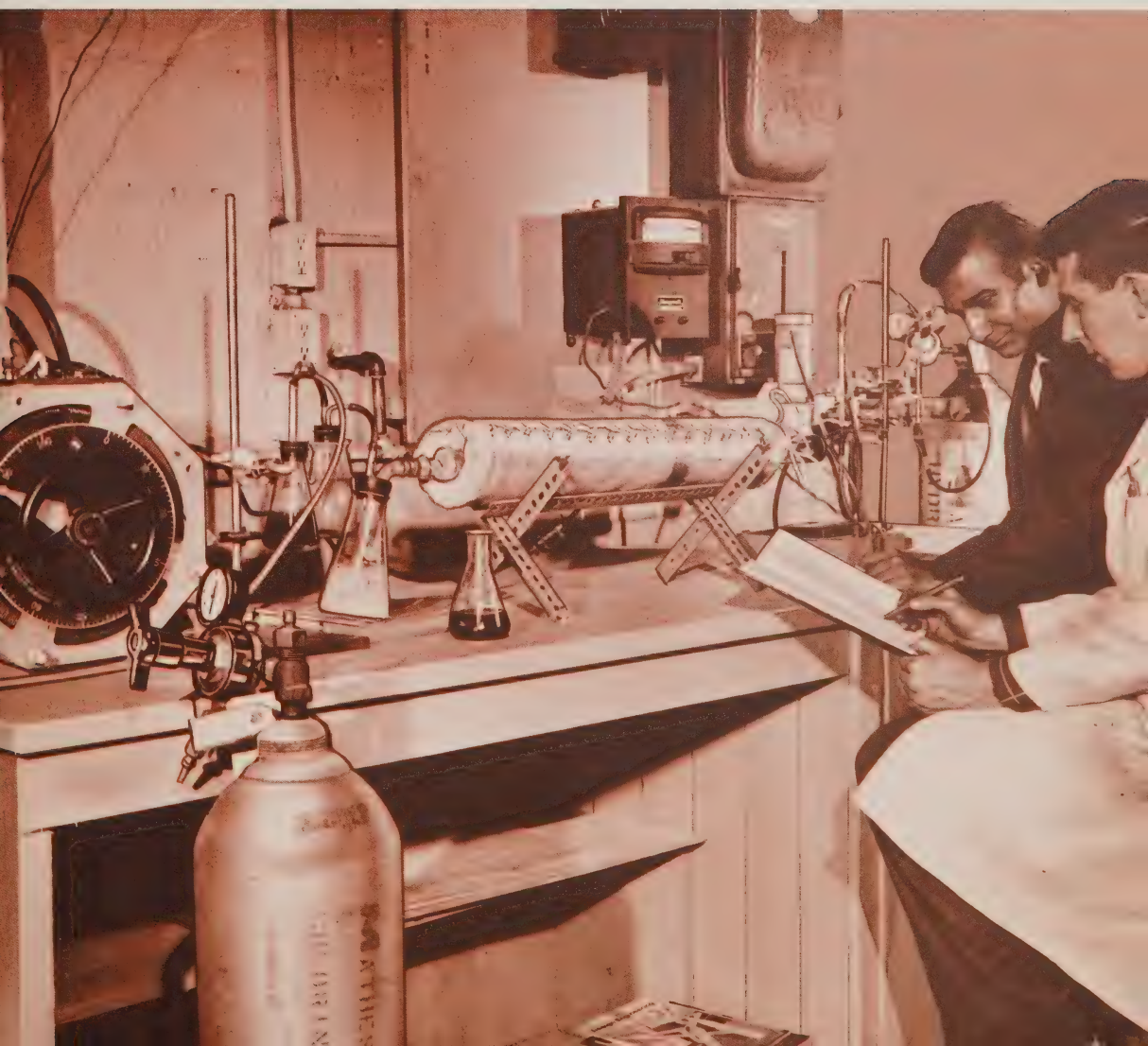
Masterloy has recently acquired a multiple-hearth roasting facility capable of roasting 18,000,000 pounds of molybdenum concentrates annually. This, coupled with the Geo-Met multiple-hearth roaster located in Northern Ontario, gives a combined roasting capacity in excess of 24,000,000 pounds annually.

Molybdenum concentrates can be roasted on a toll basis, or the customer may arrange for a package agreement with Masterloy to take the concentrate through from sulfide to oxide and finally to ferromolybdenum or self-reducing molybdenum briquettes.

Represented by:

Continental Ore Corporation
500 Fifth Avenue
New York, N.Y., 10036
Tel: 563-5700 (Area Code 212)

Metallurgists discuss results of a chloridization experiment in Geo-Met's laboratory. Chloridization process is used to extract pure metals from raw ore.



George Kelk Limited

5 Lesmill Road

Don Mills, Ontario, Canada

Tel: 444-8464 (Area Code 416)

washer load cells

Established in 1953, George Kelk Limited is an electronic and electromechanical engineering firm designing and manufacturing devices and instruments for industrial control and measurements of force and strain.

The company is exhibiting three washer-type load cells with capacities ranging from 500,000 pounds to 4,000,000 pounds and a load-cell readout amplifier.

Kelk washer load cells are strain gauge compression-type transducers for the measurement of force or weight and are made with capacities up to 8,000,000 pounds per cell. The load-sensing elements are forged steel rings with resistance strain gauges bonded to them.

Load cells were developed to meet the growing need of rolling mills for load-metering facilities installed at modest cost with a minimum loss of production time. Kelk washer load cells are usually mounted in a space in the mill housing provided by removing metal from the top of the nut.

The washer-type cell is easily installed and does not require expensive modifications to screws or chock or to the mill housings. There is no rotational movement of the cell and it is not exposed to damage from external sources. These factors, together with its sealed construction, result in long operating life.

The Kelk load-cell readout amplifier has the proper characteristics for operation in mill environments with extremes of temperature and electrical interference. It can produce control signals at predetermined load levels for mill sequencing, alarm or protection and can be used to produce analog signals for gauge control systems.

Every installation by George Kelk Limited is custom-engineered.

Kelk load-cell readout amplifiers, with recorders and pulpit meters as desired, provide rolling mills with completely integrated load-metering systems.

The Kelk washer-type load-sensing element designed to meet the growing needs of rolling mills for load-metering facilities.



Mannesmann Tube Company, Limited

547 Wallace Terrace

Sault Ste. Marie, Ontario, Canada

Tel: 253-2355 (Area Code 705)

seamless pipe

Established in Sault Ste. Marie nearly 10 years ago and currently exporting to more than 35 countries, Mannesmann Tube Company, Limited is regarded as one of the world's most modern producers of seamless pipe.

Seamless pipe produced in the fully automatic Mannesmann rolling mill is available in sizes from $4\frac{1}{2}$ to $10\frac{3}{4}$ inches, with wall thicknesses from 0.188 inch to 1.750 inches, depending on the pipe diameter. Hot rolled square pipe from $3\frac{1}{2}$ to 8 inches square for structural use is now in production.

All pipe is produced in accordance with a number of specifications including ASTM, AISI, ASME and ASA. Mannesmann is also licensed to produce casing and line pipe using the American Petroleum Institute monogram. Victaulic pipe and mechanical tubing are also produced.

The silicon-killed steel used in making seamless pipe is graded in accordance with designed

ranges of plain carbon and alloy grades to meet exacting specification requirements. Pipe is rotary pierced from hot billets at temperatures of 2,250 to 2,400 degrees F., depending on steel grade and operating factors. This process permits the use of a large selection of steel grades. All pipe is hot rolled, with finishing temperatures ranging from 1,450 to 1,650 degrees F. Physical properties are thus obtained by steel chemistry and not by cold working which builds up internal stress.

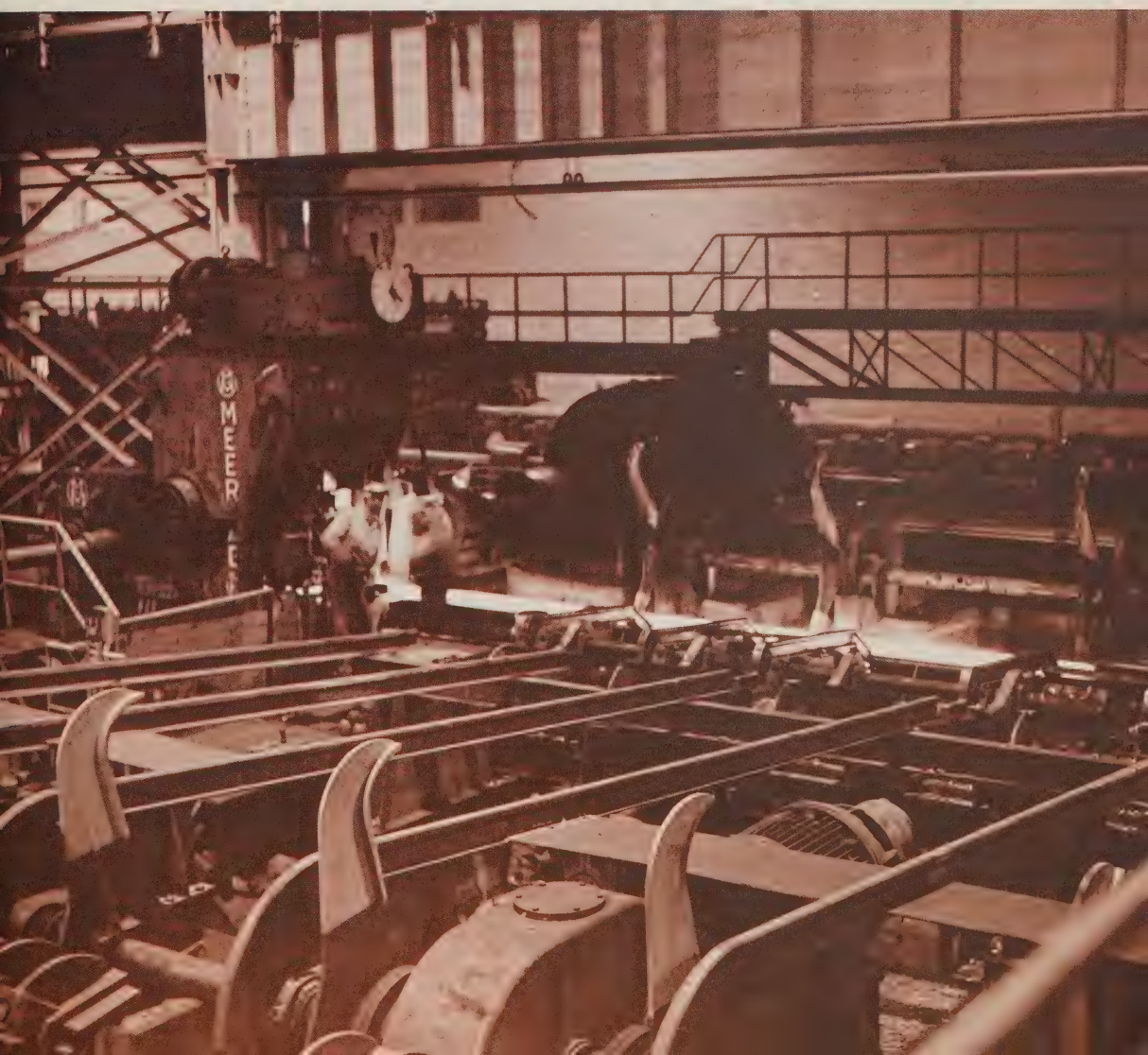
Mannesmann has developed and perfected a process to prevent sulfide cracking in pipe. This is accomplished by internally quenching pipe of selected steel analysis. A large volume of water at high velocity is passed spirally through each pipe. This rough hardening, followed by a high-temperature temper, results in a sulphide corrosion-resistant product having both required grain structure and physical properties. Development of this process lifts the restrictions on pipe used to carry hydrocarbons or pipe used in a hydrogen sulphide environment.

Represented by:

American Mannex Corporation
Limited
630 Fifth Avenue
Suite 3007
New York City, N.Y., 10020
Tel: 245-0220 (Area Code 212)

American Mannex Corporation
Limited
3015 Richmond Avenue
Suite 108
Houston, Texas, 77006
Tel: 526-1337 (Area Code 713)

In the plug mill of the Mannesmann Tube Company plant, seamless pipe is reduced to its final wall thickness and elongated to its final length.



Pneuco Machinery Company

394 Symington Avenue
Toronto 9, Ontario, Canada
Tel: 763-4381 (Area Code 416)

press brake

Based on a patented air-actuated principle, a unique press brake from Pneuco Machinery Company is an outstanding development in the field of sheet metal forming and bending. Since its introduction early in 1963, the press brake has attracted international attention and proved itself in varied industrial situations in 30 countries.

The press brake's low-pressure air-actuated operation — without motor or hydraulic system — results in lower production costs. The pneumatic power ram permits precise controlled operation and produces uniform bending and forming of sheet metal.

Its compact simplicity of design streamlines operation and its exclusive upstroking action allows more control over production work, lowering rejections substantially. Maximum speed is obtained throughout the stroke until the work is contacted. In production rates, Pneuco

matches mechanical press brakes, surpasses hydraulic installations and is substantially less expensive than either.

The Pneuco press brake operates without vibration — its smooth, effortless functioning improves the quality and quantity of work done. Efficient bending pressure, varied with fingertip control, ranges from 10 to 100 pounds per square inch. Faster operation is possible through a flexible cycle, allowing minimum stroke to be used.

Pneuco is displaying its Model 600-15 and Model 400-15, both with a 15-ton capacity—ideal for on-site operations. More than 15 different models in ram and bed lengths from 24 to 144 inches, ranging in capacity from 15 to 75 tons, are available.

In the new models, an inching system operated by a foot pedal has been added, making it possible to stop the ram at any point for easier set-up. Variable pressure and speed control are provided, with adjustments made easily by hand knobs. A full V-guiding system makes the ram move evenly and stay in line.

The Pneuco press brake, powered by an expendable pressure chamber, represents a pioneering principle in forming and bending sheet metal. The company produces models with rated capacity up to 75 tons and in lengths up to 144 inches.



Wallaceburg Brass Limited

1355 Wallace Street

Wallaceburg, Ontario, Canada

Tel: 627-3361 (Area Code 519)

custom-made precision non-ferrous products

Since 1905 the growth of Wallaceburg Brass Limited has been based on three essentials: men, imagination and machinery. An independent Canadian company manufacturing non-ferrous metal products — principally brass, zinc and aluminum — to customer specifications, Wallaceburg Brass has varied facilities for flexibility of service and is only 70 miles from Detroit.

The company produces cored and solid forgings from brass and aluminum, shell mold castings, automatic screw machine parts and die castings from zinc and aluminum. More than 25 tons of brass are melted and poured each day. The modern foundry was among the first in Canada to produce shell mold castings successfully on a high production basis.

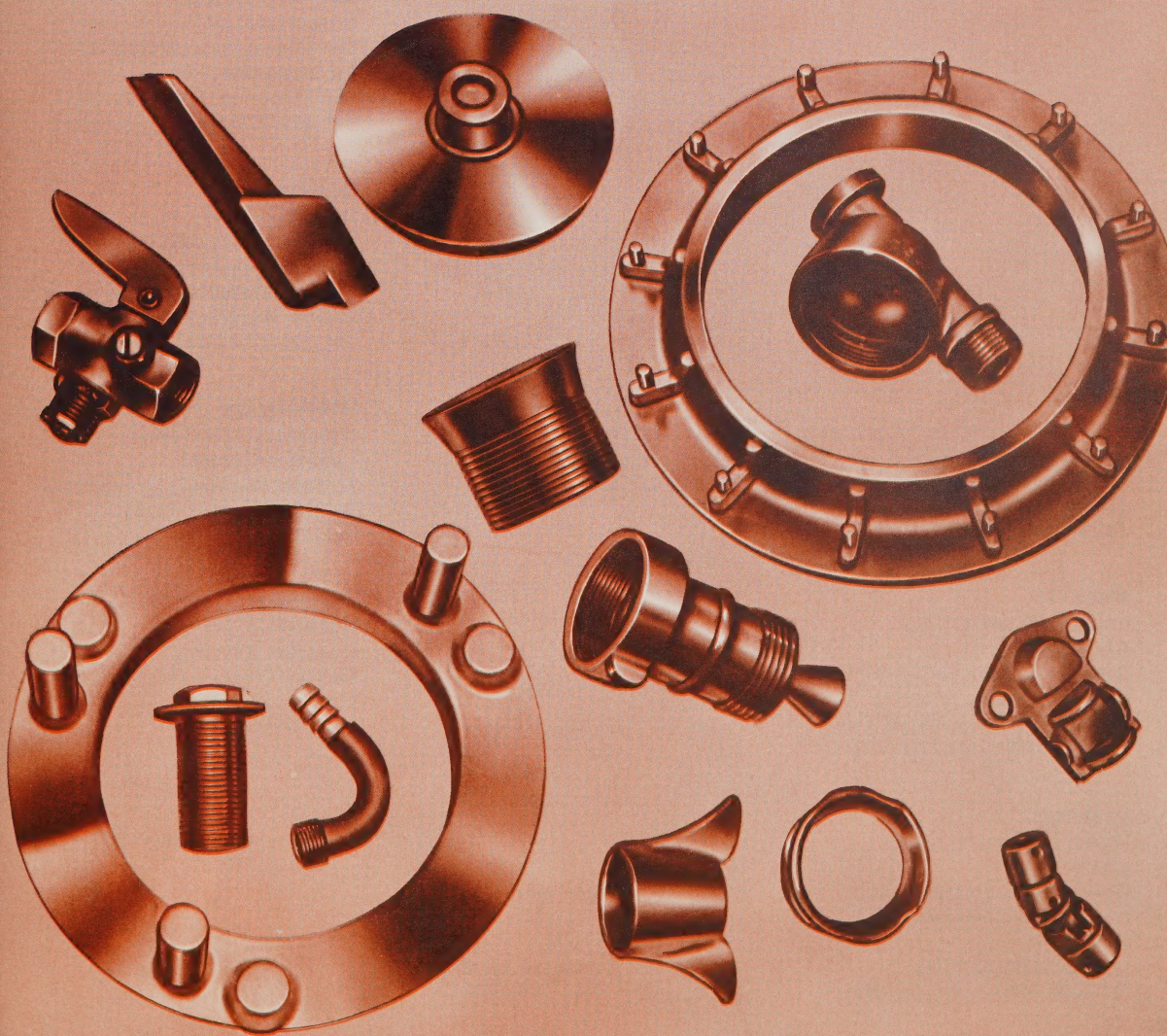
Wallaceburg Brass and its

three subsidiaries manufacture a complete custom line of non-ferrous castings, including plumbing brass-valves and fittings for steam, water and gas. Plumbing and laboratory fittings from Wallaceburg Brass are shipped from coast to coast in Canada.

A consulting service is offered by the company to assist customers in determining whether their products or components should be die cast, forged or machined. The engineers at Wallaceburg Brass have the experience in each of these processes to select the most economical method consistent with the quality requirements of the customer.

The company's custom-designed die-cast products are used in the manufacture of automobiles, household appliances, plumbing and air-conditioning components, and in other applications.

Brass components from Wallaceburg Brass Limited are forged to customer specifications. Forgings here include parts for fire extinguishers and fire hydrants, plumbing and laboratory fittings and a pump impeller.



information

Officials of the Canadian Department of Trade and Commerce and representatives of participating firms in the 1965 National Metal Exposition and Congress at Detroit will be pleased to answer inquiries. Further information is available from the following Canadian trade offices.

Detroit

Consul and Trade Commissioner
Canadian Consulate
1139 Penobscot Building
Detroit, Michigan, 48226
Tel: 965-2811 (Area Code 313)

Boston

Consul and Senior Trade
Commissioner
Canadian Consulate General
607 Boylston Street
Boston, Massachusetts, 02116
Tel: 262-3760 (Area Code 617)

Chicago

Consul and Senior Trade
Commissioner
Canadian Consulate General
310 South Michigan Avenue
Suite 2000
Chicago, Illinois, 60604
Tel: 427-7926 (Area Code 312)

Cleveland

Consul and Senior Trade
Commissioner
Canadian Consulate
Illuminating Building
55 Public Square
Cleveland, Ohio, 44113
Tel: 861-1660 (Area Code 216)

Los Angeles

Consul and Trade Commissioner
Canadian Consulate General
510 West Sixth Street
Los Angeles, California, 90014
Tel: 622-2233 (Area Code 213)

New Orleans

Consul and Trade Commissioner
Canadian Consulate General
Suite 1710
225 Baronne Street
New Orleans, Louisiana, 70112
Tel: 525-2136 (Area Code 504)

New York

Deputy Consul General
(Commercial)
Canadian Consulate General
680 Fifth Avenue
New York City, N.Y., 10019
Tel: 586-2400 (Area Code 212)

Philadelphia

Consul and Trade Commissioner
Canadian Consulate
3 Penn Center Plaza
Philadelphia, Pennsylvania, 19102
Tel: 563-5838 (Area Code 215)

San Francisco

Consul General
Canadian Consulate General
333 Montgomery Street
San Francisco, California, 94104
Tel: 981-2670 (Area Code 415)

Seattle

Consul General
Canadian Consulate General
The Tower Building
Seventh Avenue at Olive Way
Seattle, Washington, 98101
Tel: 682-3515 (Area Code 206)

Washington

Commercial Counsellor
Canadian Embassy
1746 Massachusetts Avenue, N.W.
Washington, D.C., 20036
Tel: 332-1011 (Area Code 202)

Mexico

Commercial Counsellor
Canadian Embassy
Melchor Ocampo 463, 7th Floor
Mexico City 5, D.F.
Tel: 33-14-00

Information

The following information is provided for the purpose of providing a general overview of the project. It is not intended to be a detailed description of the project or to provide a basis for comparison with other projects. The information is provided for the purpose of providing a general overview of the project. It is not intended to be a detailed description of the project or to provide a basis for comparison with other projects.

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